Climate Adaptation Engineering:
Is Adaptation a Workable Solution to Climate Change ?

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Abstract

The climate change debate is often characterized by worst-case thinking, cost neglect, probability neglect, and avoidance of the notion of acceptable risk. And much of the climate change debate has focused on costly measures to reduce CO_2 emissions. Climate adaptation, such as reducing vulnerability of infrastructure to extreme weather events, is much less costly, more effective in the short-term, and in many cases a sound investment even if climate projections turn out to be inaccurate.

The presentation will describe how risk-based and cost-benefit approaches are well suited to decision-making in these uncertain environments. Structural reliability, systems modelling and probabilistic methods are used to model infrastructure performance, effectiveness of risk reduction strategies, exposure, losses, and costs. The concepts will be illustrated with current research of risk-based assessment of climate adaptation strategies including designing new houses in Australia subject to cyclones and extreme wind events. He has shown that small improvements to house designs at a one-off cost of $2,000 per house can achieve billions of dollars of net benefit - this offsets the predicted adverse effects of climate change for a very modest cost. Climate change can increase deterioration and decay rates, hence, other case studies to be presented include assessing the need for improvements to the durability of concrete structures, and changes to the maintenance of timber power pole electricity networks.

Professor Mark Stewart is Director of the Centre for Infrastructure Performance and Reliability at The University of Newcastle in Australia. He is the co-author of *Probabilistic Risk Assessment of Engineering Systems* (Chapman & Hall, 1997), *Terror, Security, and Money: Balancing the Risks, Benefits, and Costs of Homeland Security* (Oxford University Press, 2011), and *Chasing Ghosts: The Policing of Terrorism* (Oxford University Press, 2016), as well as more than 400 technical papers and reports. He has more than 30 years of experience in probabilistic risk and vulnerability assessment of infrastructure and security systems.